

A Guide To SSP Therapy

What is SSP therapy?

SSP therapy is a low-frequency stimulation therapy developed based on the idea of needle-free acupuncture. It is an electrical stimulation therapy that stimulates the surface of acupressure points, which was invented by the late Dr. Masayoshi Hyoudou, professor of the Department of Anesthesiology of Osaka Medical College, and developed through industry-university joint development with Nihon Medix. The therapy gives low-frequency electrification with small metal electrodes called SSP. This therapy, which is easy to operate and has high therapeutic effects without any side effects, became very popular in a manner extreme enough to be regarded as synonymous for low-frequency stimulation therapy, and has been studied from various perspectives.

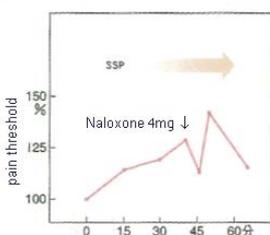


* Definition of SSP therapy: an electrical stimulation therapy to stimulate the surface of acupressure points by placing SSP electrodes on the acupressure points. In Masayoshi Hyoudou and Toshikatsu Kitade. SSP Therapy. SSP therapy study group in Japanese.

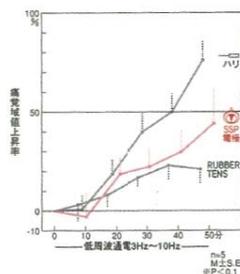
Characteristics of SSP electrodes

Low-frequency electrical stimulation therapies using SSP electrodes are called Transcutaneous Electrical Acupuncture-like Stimulation (TEAS). How can using SSP electrodes produce the acupuncture-like effect? SSP electrodes can provide stimulation similar to acupuncture

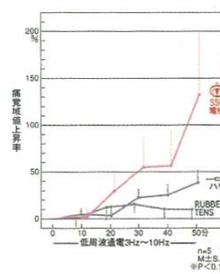
treatment to the body without needles. Electricity smoothly flows from the pointed tips of silver plated SSP electrodes to the body. The electrical density of this flow is extremely high; the electrical flow stimulates nerves with the pain that is felt when a needle pricks the body. The pain is felt little despite a strong electrical flow because only a very small area is stimulated by the SSP electrode tip.



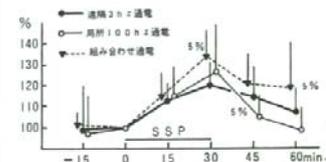
Temporary reduction of pain threshold, that was elevated by SSP therapy, by naloxone. Naloxone is an antagonistic agent against morphine. This graph shows that a morphine-like substance is secreted by SSP therapy.



Comparing the elevation rate of the pain threshold using an algemeter.

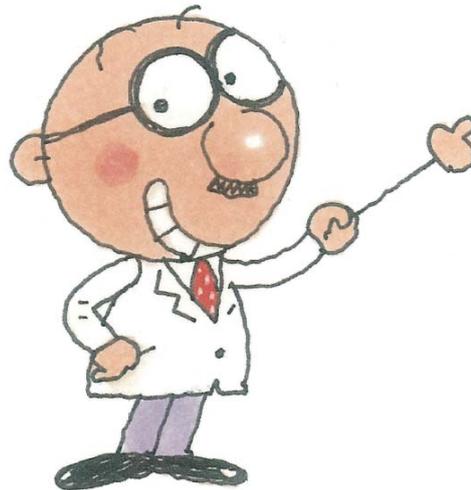
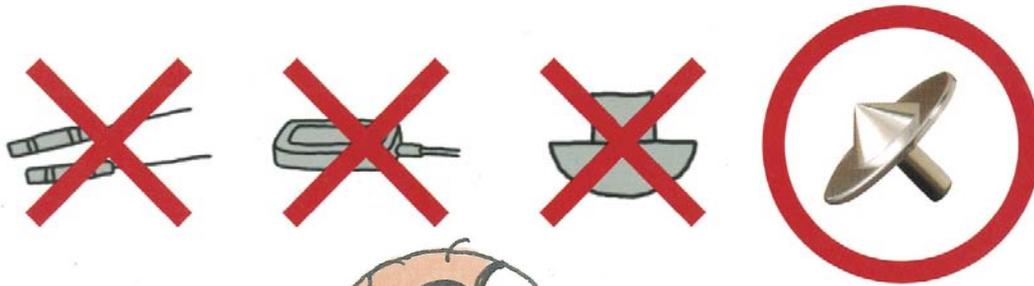


Comparison of the elevation rate of the pain threshold by potassium ion permeation.



Change of the pain threshold rate. The pain threshold elevation was significantly changed by concomitant use of a localized high frequency stimulation (100 Hz) with a low frequency stimulation (3 Hz) to a remote site as compared with a single application of each one (Shoji Shinohara et. al. Examination of effective electrification conditions of SSP therapy — Analgetic effects by combining high-frequency localized stimulation and low-frequency remote stimulation. The 10th SSP therapy central seminar lecture collection. The SSP therapy study group, 1989 (in Japanese)).

What does an SSP electrode look like?



The greatest characteristic of SSP therapy is the SSP electrode itself.

The Silver Spike Point (SSP) electrode has the following characteristics of shape, materials and electrification:

1. With its small spiky shaped electrode, it accurately hits the therapeutic points.
2. Remarkably durable brass is used as the material, and silver with good electrification efficacy is plated on it.
3. A conical tip has an acute angle of 90° to press acupressure points effectively.
4. Ideal electrical current distribution. The current concentrates on the electrode tip, and a round rimmed part disperses excessive current.

The area of the SSP electrode tip is larger than that of a needle, but it is too small for the body to clearly recognize the stimulation as pain. Accordingly, the SSP electrode can very strongly stimulate the skin with keen senses. There is concern that excessive current may cause burns, but the excessive current also flows through both the tip and a disc-shaped rim. This acts as a safety device.

Electrical characteristics and skin treatment

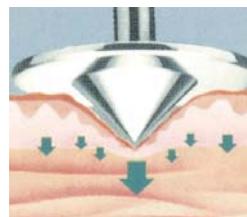
The corneum (a kind of grime) of the skin surface barely conducts electricity, but muscles, blood vessels and nerves beneath the skin conduct electricity very well. Therefore, the body can be thought of like a bag of corneum containing physiological saline. SSP electrode stretches this corneum film with the tip of the electrode to reduce the electrical resistance.



Tube cord electrodes.
Easily suck and adhere to the skin with the sucking effect of a cup when placed on the skin.



Illustration of a tube cord electrode.
There is a silver SSP electrode in a cup.



Shape of an electrode tip that effectively presses a pressure point.

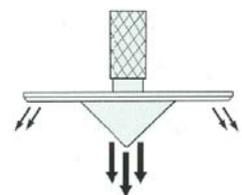


Image of electrical current distribution

How to use SSP therapy !



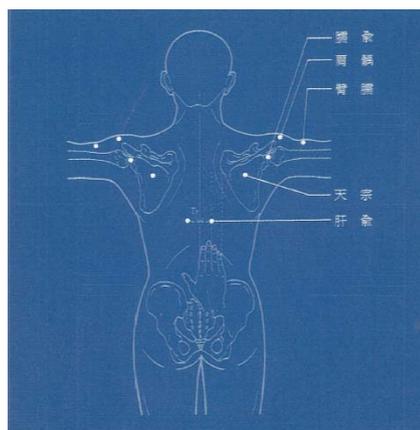
Action mechanism of SSP therapy

Gate control theory

Eliminate algesic substances by improving local blood current

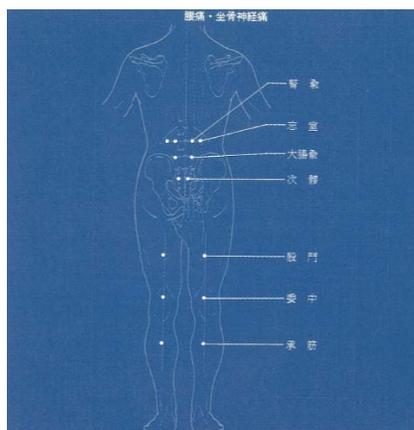
Descending pain suppression effect by endogenous morphine-like substances

Restoration of the natural healing ability by stress reduction



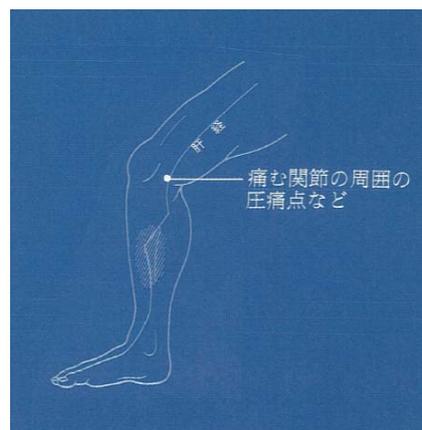
Adaptation example 1 Shoulder

Stimulation of tender points around the shoulder joint, the suprascapular nerve and the levator scapulae muscle are effective for shoulder stiffness and frozen shoulder.



Adaptation example 2 Lumbar

For general lower back pain without structural disease, stimulation or exercise, strengthening the erector spinae muscles is effective. In addition, the lumbar region is an area where a profound synergetic effect can be obtained from concomitant use with far-infrared ray radiation.



Adaptation example 3 Knee

A variety of pains are in the knee joint region. Selecting therapeutic points to strengthen the quadriceps femoris muscle and reduce the joint pain is important for knee osteoarthritis.

Therapeutic points

Changes in the electrical resistance of the skin include a unified change of the entire skin, and changes that occur separately in eight large parts of the body divided into upper and lower, left and right, and dorsal and frontal. This phenomenon is a zone specific reaction of the sympathetic nerve of the skin. In addition, if a subacute disorder exists in an organ or other locations, electrically conductive points appear in specific sites of the body trunk. Electrically conductive points also appear as reaction points in cases with

pain and orthopedic disease. It is presumed that these electrically conductive points occur through the sympathetic nerve. Electrically conductive points can be used as therapeutic points for acupressure points. That is, spots with spontaneous pain and tender points, which are the sites where it hurts when pushed, are also good sites to treat with SSP electrodes. Unsurprisingly, electrifying electrically conductive points where the electricity flows easily is much simpler than electrifying those spots where the electricity does not flow very well. Spots with pain and spots where the electricity flows easily can be therapeutic points. Therapeutic points are not limited to acupuncture points.

Action mechanism of SSP

① Conveying information in the peripheral nerves and its effect

All stimulation is transferred through the sensory neuron (afferent neuron) and information related to extending muscles is transferred from a muscle spindle to the central nerve system through nerves called Ia. Information is transferred from the central nerve system to the periphery through motor neurons and the autonomic nerve (efferent neuron). The effects of stimulation therapies such as acupuncture and SSP therapy are primarily based on modifying the local bloodstream amount and sensation, especially the analgesic effect. Mechanisms called conscious transference, gate control theory and descending pain suppression neurologically modify pain through stimulation therapy. Transference of the conscious is displacing a concentration of the consciousness related to pain to another part of the body. For example, pinching your flank when you are injected with a vaccine induces conscious transference, and the pain is felt as if reduced.

② Gate control theory

Gate control theory concerns preventing the transfer of pain information through thin nerves to the central nerve at the spinal cord level, sending a large quantity of information from the region with pain through sensory nerves with a thick axon to the central nerve by rubbing or stroking the area with pain. In this case, masking the pain information with stimulation much weaker than the pain is required. A large quantity of rubbing information is required for this purpose; therefore, soft stimulation at a relatively high frequency (50-100 pps (Hz)) is administered.

③ Descending pain suppression

When President Nixon of the United States and Prime Minister Tanaka visited China in 1971, Chinese acupunctural anesthesia was reported all over the world. This analgesic effect provides nociceptive stimulation (pain stimulation) by SSP electrode, which is transferred to the central nerve system, and a reaction to reduce the pain, which is an endogenous morphine-like substance secreted to nerve synapses, develops in the brain. As a result, information to suppress the pain descends the spinal cord; the nerve to send the pain information to the brain is suppressed by a presynaptic inhibition to prevent the transfer of the pain information to the brain. This is the mechanism that reduces the pain. The antalgic effect of SSP therapy utilizes this mechanism.

● *Endogenous morphine-like substances*

Endorphin and enkephalin are well-known as endogenous morphine-like substances. The alkaloid with analgesic action contained in opium is called morphine. Although morphine is a plant substance, it shows a strong analgesic effect on vertebrate animals including humans because vertebrate animals have morphine receptors (opiate receptors) in the body. If such receptors exist in the body, that means that original physiological neurotransmitters that bind to such receptors should exist in the body. This substance was a mystery for a long time, but an

endogenous morphine-like substance was finally extracted from swine brain tissue by Hughes et al. in 1975. This is enkephalin, which means in the brain. Then, α -, γ -, and β -endorphins were discovered one after another. Until now, about 20 substances including neoendorphin, dynorphin and kyotorphin have been discovered. Usually, the sympathetic nerve is totally suppressed when such substances are secreted; therefore, the bloodstream of the entire body is improved and the body relaxes.

Somatic vs. autonomic reflex and restoring natural healing ability

In SSP therapy, a number of electrodes (8 to 10) are multi-segmentally placed on the body. Therefore, an analgesic effect induced by stress as well as analgesic effect due to stimulation are simultaneously produced. As a result, the functions of the sympathetic nervous system are suppressed, the limbs become warm, which is peripheral blood vessel dilatation, and peaceful sleep is induced. Bloodstream improvement due to peripheral blood vessel dilatation is also observed in addition to breaking out of a negative pain spiral by reducing the pain. All these effects can be the mechanism for a cure. SSP therapy stops the vicious cycle of pain, as well as reducing preexistent stress by transiently giving stress to facilitate a natural healing ability. Electrical stimulation never damages the tissues where SSP electrodes are placed, but the stimulation is qualitatively pain stimulation (nociceptive stimulation); therefore, qualitatively more important damage information is sent to the central nerve system than the actual disease. As a result, the body tries to handle the condition more seriously than the actual situation. In other words, localized stimulation is expected to promote the natural healing ability.

● *Zone specific reaction of the sympathetic nerve*

The sympathetic nerve appears to always show the same reaction throughout the body, but this actually does not always happen and all regions separately demonstrate their functions. For example, the sympathetic nerve of the lower part of the body increases its activity with a change in position from supine to standing to ensure the blood pressure in the brain during the change in position, which is the contraction of blood vessels of the lower part of the body. The sympathetic nerve systems of the skin and muscles also show conflicting behaviors. The stellate ganglion in the neck and lumbar sympathetic ganglion in the lumbar region control the functions of the sympathetic nerve that has a large innervation zone and shows the zonal function. In addition, hemihidrosis, which appears to the right or left side or the upper or lower half of the body by forming a boundary with the hilum, is also well-known as a zone specific reaction of the sympathetic nerve.

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